REMARKS

Applicant has carefully studied the outstanding Office Action. The present amendment is intended to place the application in condition for allowance and is believed to overcome all of the objections and rejections made by the Examiner. Favorable reconsideration and allowance of the application are respectfully requested.

Applicant has amended claims 1 – 5, 9, 11, 13, 14, 17, 18, 27 – 31, 33, 35, 36, 39, 40, 45, 49, 50, 53 – 57, 61, 63, 65, 66, 69 and 70 to more properly claim the present invention. No new matter has been added. Claims 1 - 80 are presented for examination.

In Paragraph 1 of the Office Action, the disclosure is objected to as containing embedded hyperlinks. Applicant has accordingly deleted the sentences in the disclosure that contain the embedded hyperlinks.

In Paragraph 2 of the Office action, claims 5, 18, 31, 40, 57 and 70 have been rejected under 35 U.S.C. §112 as being indefinite, for use of the phrase "substantially similar". Applicant has amended these claims to replace the phrase "substantially similar" with the phrase -- visually similar --. Visual similarity is described in the original specification on page 13, lines 21 and 22, and lines 30 – 37; page 20, lines 14 – 16; page 21, lines 34 and 35; and page 22, lines 31 – 33. A specific embodiment for generating modified pixel data that is visually similar to the stored pixel data is indicated in FIG. 6.

In Paragraph 3 of the Office Action, claims 1, 4, 6 – 8, 10 – 14, 17, 19 – 21, 23 – 27, 30, 32, 34 – 36, 39, 41, 43 – 53, 56, 58 – 60, 62 – 66, 69, 71 – 75 and 77 - 80 have been rejected under 35 U.S.C. §102(e) as being anticipated by Mast, U.S. Patent No. 5,881,287 ("Mast").

In Paragraph 4 of the Office Action, claims 2, 3, 5, 15, 16, 18, 28, 29, 31, 37, 38, 40, 54, 55, 57, 67, 68 and 70 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Mast in view of Mills et al., U.S. Patent No. 6,088,355 ("Mills").

In Paragraph 5 of the Office Action, Claims 9, 22, 33, 42, 62 and 76 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Mast in view of Mages et al., U.S. Patent No. 6,463,467 ("Mages").

Distinctions between Claimed Invention and U.S. Patent No. 5,881,287 to Mast in view of U.S. Patent No. 6,088,355 to Mills et al. and further in view of U.S. Patent No. 6,463,467 to Mages et al.

The present invention concerns copy protection of image data that is rendered on a video display device. Such image data can be easily copied by a PrntScrn operation, or another such operation that captures data from a video RAM. The present invention intervenes with such operations by modifying captured data so that proprietary image data is replaced with substitute image data, before the captured data reaches it destination.

Mast concerns a method and apparatus for preventing copying of images from a video adapter memory. Image data rendered on a display device must first be loaded into video adapter memory. Even if the image data is protected by encryption while stored in a computer file, the data must be decrypted and loaded into video adapter memory in order for it to be rendered, which makes such data vulnerable to unauthorized copying. Mast overcomes the vulnerability of being able to copy proprietary image data from video adapter memory, by (i) injecting hooks into operating systems graphics display functions, (ii) identifying portions of the display data that contain proprietary image data, and (iii) blocking the identified portions from being transferred to memory. (Mast / col. 1, line 62 – col. 2, line 2; col. 3, lines 38 – 49; col. 8, lines 18 – 23)

Unlike Mast, which involves preventing capture of proprietary image data by hooking calls to Windows API functions, the present invention operates directly on data being transferred in and out of video adapter memory (present specification / element 405 of FIG. 4), without patching Windows API functions Specifically, pages 11 and 12 of the original specification disclose vulnerabilities of protecting proprietary image data at the API layer by a system such as that of Mast, by (i) circumventing the Windows API functions, for example, using DirectDraw graphics methods, remote access programs and frame grabbers; or (ii) disabling patched API functions – for example, by intercepting the Windows API SetWindowsHookEx function, or be turning off message loops. The present invention overcomes the vulnerability of being able to circumvent patched API

functions and thereby being able to copy image data from video adapter memory, by (i) marking pixel data that is transferred into a video adapter memory by subtly modifying the data (original specification / element 550 of FIG. 5), and (ii) modifying marked pixel data that is transferred out of the video adapter memory (original specification / element 570 of FIG. 5).

Mast does not describe modifying pixel data that is being transferred into a video adapter memory. In FIG. 8 of Mast it is apparent that pixel data in the video adapter memory, as displayed in window 800A, is unmodified. Mast only modifies pixel data transferred out of a video memory, as indicated in FIG. 8 by the modification from window 800A to window 800C.

In order to further distinguish between the present invention and Mast, applicant has amended independent claims 1, 14, 27 and 36 so as to explicitly include this feature of modifying pixel data prior to its being received by the video memory.

On pages 4 and 7 of the Office Action, the Examiner, in rejecting claims 1 and 27 respectively, cites Mast, column 3, lines 30 – 49 and col. 10, line 53 – col. 11, line 1, as disclosing modifying stored pixel data. Applicant respectfully submits that the description in Mast refers to modification of data being transferred out of the video adapter memory, and not data being transferred into the video adapter memory. Specifically, at col. 31, lines 30 and 31, Mast refers to "*transfers of image data from the video adapter to other storage means*". Similarly, the discussion in Mast at col. 10 with reference to FIG. 8 refers to data being transferred from a display image 800A already within the video adapter memory (the source) to another storage area (the destination).

Mills concerns transfer of ATM cell data between an ATM network and another processing system, such as a set top box.

On page 14 of the Office Action the Examiner, in rejecting claims 2 and 28, cites Mills, col. 13, line 59 – col. 14, line 9, as disclosing modifying least significant bits of RGB color vales. Mills describes a 5-5-5-1 RGBA graphics mode, which stores 5 bits each of R,G and B values, and a one-bit alpha value (Mills / col. 13, lines 36 and 37); and a 4-4-4-4 RGBA graphics mode, which stores 5 bits each of

R, G, B and A values. Applicant respectfully submits that Mills does not describe modification of RGB color values, but instead describes two different pixel color formats, the latter of which sacrifices one bit of R, G and B accuracy in order to achieve four bits of A accuracy. That is, Mills refers to the bit locations themselves, and not to the values of the bits. In distinction, the present invention describes modification of RGB values by assigning a 0 or 1 value to a least significant bit.

Mages concerns protecting proprietary digital media delivered over the Internet by encrypting both the digital media and a media player therefor.

The rejections of claims 1 - 80 in paragraphs 3 - 5 of the Office Action will now be dealt with specifically.

As to amended independent method claim 1, applicant respectfully submits that the limitation in claim 1 of:

"*modifying the stored pixel data prior to its being received by the video RAM ...* ",

is neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 2 - 13 depend from claim 1 and include additional features, applicant respectfully submits that claims 2 - 13 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 1 - 13 are deemed to be allowable.

As to amended independent system claim 14, applicant respectfully submits that the limitation in claim 14 of:

"*a digital filter ... modifying the stored pixel data prior to its arrival at the video RAM on the first data bus* ",

is neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 15 - 26 depend from claim 14 and include additional features, applicant respectfully submits that claims 15 - 26 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 14 - 26 are deemed to be allowable.

As to amended independent method claim 27, applicant respectfully submits that the limitation in claim 27 of:

"modifying the stored pixel data prior to its being received by the video RAM ...",

is neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 28 - 35 depend from claim 27 and include additional features, applicant respectfully submits that claims 28 - 35 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 27 - 35 are deemed to be allowable.

As to amended independent system claim 36, applicant respectfully submits that the limitation in claim 36 of:

"a digital filter ... modifying the stored pixel data prior to its arrival at the video RAM on the data bus ...",

is neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 37 - 44 depend from claim 36 and include additional features, applicant respectfully submits that claims 37 - 44 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 36 - 44 are deemed to be allowable.

As to amended independent method claim 45, applicant respectfully submits that the limitation in claim 45 of:

"providing pixel data within a video RAM, the pixel data being marked such that individual pixel datum is recognizable as being protected or unprotected"

is neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 46 - 49 depend from claim 45 and include additional features, applicant respectfully submits that claims 46 - 49 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 45 - 49 are deemed to be allowable.

As to amended independent system claim 50, applicant respectfully submits that the limitation in claim 50 of:

"*a video RAM storing pixel data that is marked such that individual pixel datum is recognizable as being protected or unprotected*",

is neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 51 and 52 depend from claim 50 and include additional features, applicant respectfully submits that claims 51 and 52 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 50 - 52 are deemed to be allowable.

As to amended independent method claim 53, applicant respectfully submits that the limitations in claim 53 of:

"*modifying protected pixel data so as to mark it as being protected*",

and

"*thereafter transmitting stored pixel data including the modified protected pixel data from a computer memory to a video RAM*"

are neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 54 - 65 depend from claim 53 and include additional features, applicant respectfully submits that claims 54 - 65 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages.

Accordingly claims 53 - 65 are deemed to be allowable.

As to amended independent system claim 66, applicant respectfully submits that the limitations in claim 66 of:

"*a first pixel processor modifying protected pixel data so as to mark it as being protected*", and

"*a first data bus in which stored pixel data including the modified protected pixel data is transmitted from a computer memory to a video RAM*"

are neither shown nor suggested in Mast, Mills or Mages, taken individually or in combination.

Because claims 67 - 80 depend from claim 66 and include additional features, applicant respectfully submits that claims 67 - 80 are not anticipated or rendered obvious by Mast, Mills, Mages, or a combination of Mast, Mills and Mages. Accordingly claims 66 – 80 are deemed to be allowable.

Support for Amended Claims in Original Specification

Independent claims 1, 14, 27, 36 and 53 have been amended to include the limitation that pixel data transferred to a video RAM is modified prior to its being received by the video RAM. This limitation is supported in the original specification in FIGS. 4 and 5, and the discussions thereof on pages 19 - 22.

Independent claims 45 and 50 have been amended to move the limitation that the pixel data be marked such that individual pixel datum is recognizable as being protected or unprotected, from the preambles to the bodies of these claims.
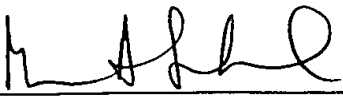
Dependent claims 5, 18, 31, 40, 57 and 70 have been amended to include the limitation that the modified pixel data is visually similar to the stored pixel data. This limitation is supported in the original specification on page 13, lines 21 and 22, and lines 30 – 37; page 20, lines 14 – 16; page 21, lines 34 and 35; page 22, lines 31 – 33; and in FIG. 6.

For the foregoing reasons, applicant respectfully submits that the applicable objections and rejections have been overcome and that the claims are in condition for allowance.

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